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SCIENTIFIC MISCONDUCT: WHY IS SCIENCE SUCH FERTILE GROUND FOR HARASSMENT AND WHAT CAN BE DONE ABOUT IT?

When I was in graduate school, a highly successful female scientist and close mentor told me about sexual harassment in our field: "Don't ever tolerate it, and don't ever report it." Her implication: reporting it could lead to a one-way road out of science.

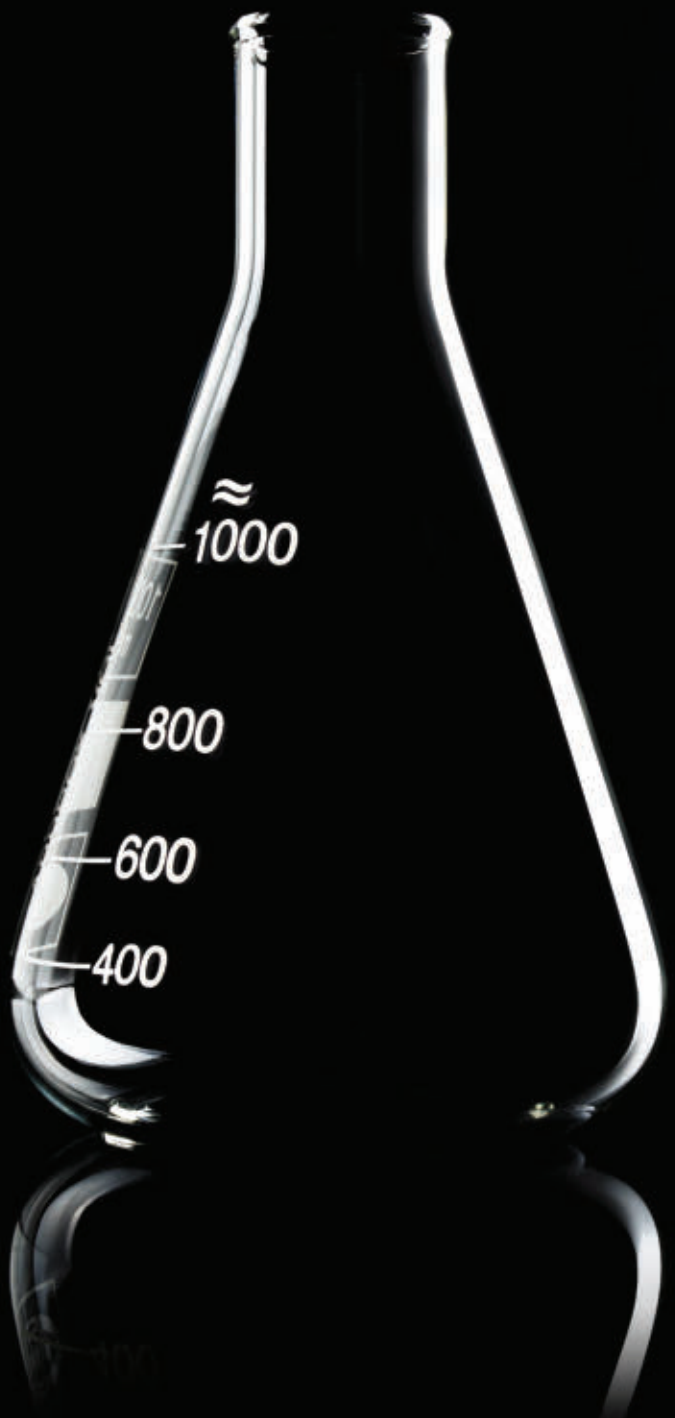
Times have changed since she shared those thoughts twenty years ago. Now that we're in the #metoo reckoning, it's tempting to think we can bid these harassers goodbye. We are entering a time and place where women's concerns are beginning to be heard, and I think it's illustrative to consider what makes science — and particularly the culture of science — such fertile ground for these abuses of power, and what people can do to help change it.

Who are the targets of abuse in science? Harassment is always about power, so the person being targeted will nearly always be outranked by the harasser. Anyone can be targeted, but we see most of this directed toward women, people of color, or other marginalized groups. For example, a recent study of astronomers found that 28 percent of women of color felt unsafe in the workplace due to their race and 40 percent due to their gender or sex. They also report that 18 percent of women of color and 12 percent of white women skipped professional events because of these concerns, leading to lost opportunities for networking and career advancement.[1] The most likely targets are the most vulnerable careerwise: graduate students, postdoctoral researchers, early-career scientists, or pre-tenure faculty.

To understand how this system is perpetuated, we need to understand how scientific careers are made. Standardized tests and transcripts are not robust predictors of success in research. In fact, there aren't many ways to objectively tell who will have the patience, diligence, and drive to use their native intellect and skills to make discoveries. So science relies on old-fashioned recommendation letters and word-of-mouth. In addition to the obvious opportunities for bias to creep in and cause harm (and it does!), this amplifies any preexisting power differentials.

Modern science follows an apprenticeship model. A senior scientist supports and mentors a team of graduate students and postdoctoral researchers who assist in the group leader's research. A typical graduate student will want to join a thriving research group for all the opportunities that come with it: cutting-edge research topics, access to the best datasets or experimental apparatus, steady funding to attend conferences in their field, networking opportunities for future jobs, and, of course, mentorship from a highly successful scientist. If things go well, they also receive a recommendation letter from their respected mentor. Once in such a group, students usually try to stay, since switching to a different adviser can mean starting over on their research, potentially adding years to their time in graduate school. There is great incentive for junior researchers to try and get along, no matter what.

This entire structure gives the head of the research group tremendous power and influence over their team. Junior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researchers depend on their advisers for letters of recommendation, and graduate students additionally require adviser approval to graduate. Further, pre-tenure faculty need to be in the good graces of these eminent researchers, as they need support (and votes) of their colleagues for tenure and promotion.

Compounding these power differentials is the nontraditional nature of many scientific workplaces in what are typically highly collaborative research efforts. Perhaps you are running a chemical reaction or have a cell culture that must be checked every few hours, so you're in the lab with other group members around the clock; maybe you're at a telescope making observations with your colleagues all night; you may be doing field work in a remote desert, perhaps even camping with your research group in Antarctica with no easy way to leave; if you're a marine researcher, you might be on a boat with fellow scientists for weeks on end; maybe your computer model runs need to be reconfigured and restarted every few hours, necessitating odd hours being kept; maybe you're a graduate student trying to finish a thesis, so you're in your office all the time. Or perhaps you're just at a conference trying to network with colleagues over dinner and drinks.

If these situations sound like potential bonding experiences, that's because they are. Many friendships are kindled in the lab or in the field, and some close friends have only seen each other at conferences. On the flip side, there are situations in science that can lead to crossed boundaries or uncomfortable situations with coworkers or supervisors.

Now let's add some bad behavior. Imagine a graduate student experiences some harassment from her male adviser. Let's say the adviser has made an advance on the student. Now the junior researcher is essentially stuck. She could tolerate the behavior, she could reject the behavior and hope to salvage the professional relationship, or she can report him. All of these options are risky. If the adviser feels hurt or threatened, he may stop bringing her to do field work, so she may not acquire needed data for her thesis. He may stop supporting her altogether. He might act like everything is fine, but write

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a negative reference letter when she applies for her next job. He might do none of these things outwardly, but just quietly pick up a phone and throttle her job prospects. "I invested a lot of time in her as a student, and she's likable and enthusiastic, but unfortunately just not that bright. I don't think she'd be a good match for your position." Or, "I know she wrote a seminal paper in the field, but I had to help her a lot with that — she's just not very good at independent work." He has many options to harm or end her career with no easy way for her to prove retaliation. Even in a best case where she files a complaint and wins, she will still need to change advisers, potentially having to learn a new subfield in the process, delaying her career progression. As research fields tend to be small, the influence of her adviser may be too much, and she might have to change her research area completely.

Consider the colleagues our student could turn to for support. Her colleagues have professional and personal incentives to get along with all parties involved. They may be collaborators of the harasser; they may want access to a dataset he controls; they may need his support for their own promotion at work. Since they haven't likely witnessed the bad behavior personally, it may seem less real to them or they might imagine it is being exaggerated. The student holds no such power, so anyone she turns to, even if they are sympathetic to her situation, is incentivized to not cross the harasser. In reality, many try to paint themselves as neutral, not wanting to get involved. They might throw up their hands and say they don't want to take sides.

Desmond Tutu once commented: "If you are neutral in situations of injustice, you have chosen the side of the oppressor. If an elephant has its foot on the tail of a mouse and you say that you are neutral, the mouse will not appreciate your neutrality."

What needs to change?

We must stand up to harassers and not tolerate their abuse of power. This means reporting problems, punishing abusers, and supporting their victims. We also need to consider the cultural aspects fostering and nurturing the perfect habitat for abuse to flourish. Some schools are moving toward a system of teams of graduate advisers — groups of two or three people to help supervise — so the power over the student's career progression isn't concentrated in one person.

Schools, research institutes, funding agencies, and professional organizations need to hold abusers accountable for their professional misconduct the same way they would research misconduct. When someone violates the ethical code of their profession, they should face serious consequences, whether removal from professional organizations, withholding of research funds, or termination of employment.

Individual scientists need to remember that there is no such position as neutral surrounding an abuse of power. We do have to choose a side.

We also need to be aware of what retaliation looks like. If a senior scientist is badmouthing a junior researcher, particularly a woman or person of color, that should immediately send up a red flag. Scientists who hear such stories need to look further, ask around, or perhaps speak directly with the junior scientist to see if the criticism is warranted or whether it may be a result of bias or retaliation.

The good news is that media coverage of high-profile scientists, entertainers, and politicians being called out for bad behavior has placed harassment on our national radar. Professional organizations, universities, and research institutes are engaging in serious discussions about what they can do to foster an ethical and professional research environment.

Changing the culture will take time, but that does not mean we should be patient. Every day, talented scientists are continuing to be abused and mistreated and, in many cases, pushed out of their fields entirely. It is an injustice, and one that we must work swiftly and pointedly to solve.

We cannot be neutral.

For works cited: go to www.phikappaphi.org/forum/spring2018

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